

**Remarks:**

Pending in this application at the time of the outstanding Office Action were claims 9-19, 33-36, 40, 41, and 53-86. This amendment amends claim 9, 12, 18, 53, 77 and adds new claims 87-118. Support for the new claims can be found in the specification as follows:

- claims 87-88 correspond to claims 62 and 63 (minus the limitations of antecedent claim 60);
- claim 91 finds support at, inter alia, p. 3, lines 8-10 and p. 12, lines 14-29;
- claims 92, 93, 97, 99, 108, 113, and 114 find support at, inter alia, p. 3, lines 33-35; p. 13, line 32 – p. 14, line 7;
- claims 90 and 94 find support at, inter alia, p. 7, lines 5-8;
- claims 95, 96, and 117 find support at, inter alia, p. 11, lines 3-9; p. 13, lines 1-5; p. 13, lines 11-27; and p. 14, lines 11-18;
- claims 98, 105, and 110 find support at, inter alia, p. 7, lines 1-8;
- claims 100-103 find support at, inter alia, Figure 1A and p. 8, lines 24-41;
- claims 104, 109, and 111 find support at, inter alia, Figure 1A and p. 6, lines 11-14;
- claims 89, 106 and 115 find support at, inter alia, p. 7, lines 1-5; p. 7, line 20 – p. 8, line 13; and p. 11, lines 31-33;
- claims 107 and 116 find support at, inter alia, p. 11, lines 9-18;
- claim 112 finds support at, inter alia, p. 7, lines 1-5; p. 7, line 20 – p. 8, line 13; p. 11, lines 31-33; p. 13, lines 1-5; p. 13, lines 11-27; and p. 14, lines 11-18; and
- claim 118 finds support at, inter alia, Figure 1 and p. 6, lines 27-38.

No new matter is present. The currently pending claims are now claims 9-19, 33-36, 40, 41, and 53-118.

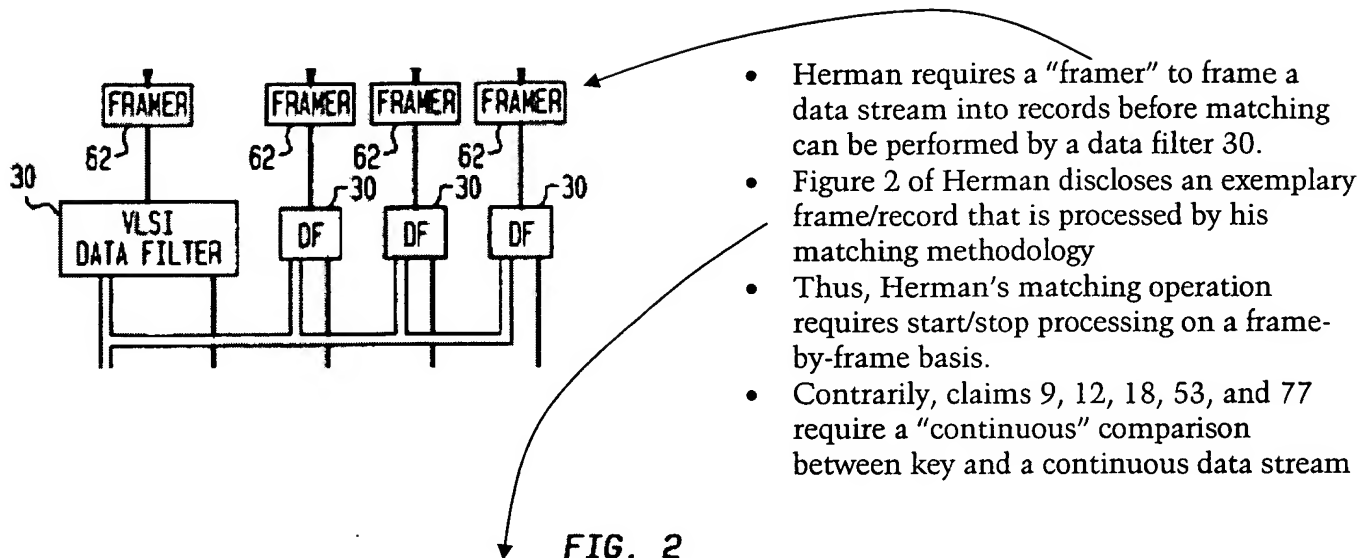
The Office Action rejected claims 9-19, 33-36, 40, 41, 53-61, and 64-81 as being anticipated under 35 U.S.C. 102(b) by U.S. Patent No. 5,050,075 issued to Herman (hereinafter “Herman”). The Office Action also identified claims 62 and 63 as being allowable, but objected to them for being dependent on a rejected independent claim.

**I. Claims 62, 87, 92, 93, 97, 99, 108, 113, and 114 recite subject matter that was identified as allowable in the outstanding Office Action.**

The outstanding Office Action at page 10 stated “Applicant’s argument, page 17, last paragraph with respect to claim 62 ‘... configured to determine that an approximate match exists if the correlation coefficient has a [value] larger than or equal to a predetermined threshold [value].’ [h]ave been persuasive[;] the rejection of claim [62] is withdrawn.” (See Office Action; page 10). Applicant notes that new claims 87, 92, and 113 also recite the limitation that a comparison of a correlation coefficient with a threshold value is used to find whether there are any hits between the key and data. Accordingly, Applicant respectfully submits that claims 87, 92 and 113 (and all claims dependent therefrom) are likewise allowable. Claims 93, 97, 99, 108, and 114 further add that the predetermined threshold value is adjustable to control the nature of the approximate matching. Accordingly, Applicant further submits that claims 93, 97, 99, 108 (and all claims dependent therefrom) are also allowable.

**II. Herman Fails to Disclose Continuous Comparisons; Instead Herman Discloses Stop/Start Frame-by-Frame Matching Operations.**

Claims 9, 12, 18, 53, and 77 recite limitations related to a retrieval device for retrieving data from a mass storage medium including a matching circuit for continuously comparing a determined key with a data signal representative of a continuous stream of data. Herman fails to disclose a device for performing continuous comparisons of a determined key and a continuous stream of data. Instead, Herman discloses a database filter containing a processing unit including an arithmetic logic unit that processes database records in a frame-by-frame, pipelined fashion. Herman requires that a “framer circuit” be used to frame a data stream into records such as the one shown in Figure 2. See Herman; Figure 3 (reference number 62; a portion of which is reproduced below); col. 5, lines 49-52. The database records that are framed by the framer circuits are then provided to data filters 30, which perform the matching operation.



DATA ATTRIBUTES			STATUS ATTRIBUTES		
ATTRIBUTE N	ATTRIBUTE 2	ATTRIBUTE 1	STATUS M	STATUS 2	STATUS 1
ADDRESS	PHONE NUMBER	NAME	WRITE ID	WRITE TIME	RECORD ID

Herman's data filter 30 in turn performs matching operations on a record-by-record basis. Figure 4 of Herman discloses that each frame/record is "buffered in the data filter for a sufficiently long time so that a batch of instructions requiring information contained *in a record* can be carried out *before the record is removed from the data filter*" See Herman; col. 3, lines 1-8 (emphasis added). More specifically, the record buffer 82 in which the database records are processed is divided into an active and a non-active buffer. A record transmitted from a framer to the record buffer is first written into the non-active buffer and then must wait until the record prior in the pipeline is processed by a batch of instructions stored in a separate buffer. The record is then moved to the active buffer where it must wait again as it is processed by a batch of instructions. After *all* of the instructions in the instruction buffers are executed, the record is moved to the non-active buffer and must wait again before it is finally released from the record

buffer. See Herman, col. 9, lines 38-58. *Thus, from Herman's perspective, each framed database record in the pipeline is processed in a "start-and-stop" or frame-by-frame fashion.* The specification of the present application expressly distinguishes this type of processing from the *continuous* processing performed by the present invention. See Application, page 2, lines 27-29.

In contrast to Herman, the claimed invention performs *continuous* comparisons between the key and a signal representing continuous stream of data as the key is continuously "slid" over the stream of data:

A logical step 88 is suggested in Figure 5 for returning to the continuous reading of data from the mass storage medium 26, indicating perhaps a "do" loop. However, it should be understood that this is a *continuous process* and that data is processed from the mass storage medium 26 *as a stream and not in individualized chunks, frames, bytes, or other predetermined portions of data.* While this is not precluded, the present invention preferably allows a key to be in essence "slid" over a continuously varying data read signal *such that there is no hesitation* in reading data from the mass storage medium 26. There is no requirement to synchronize reading to the start or end of any multi-bit data structure, or *any other intermediate steps required to be performed as the data is compared continuously "on the fly"* as it is read from the mass storage medium 26. (See Application, page 12, lines 14-27 (emphasis added); see also p. 3, lines 13-16).

[In prior art known to the inventors], the digital value of the address or data contained in the addressed location must be read and interpreted in its digital form in order to identify the data and then select it for processing. Not only does it take processing time to read and interpret the digital data represented by the address or content, this necessarily requires that the accessing circuit process the memory according to the structure of the data stored. In other words, if the data is stored in octets, then the accessing circuitry must access the data in octets *and process it in an incremental manner. This "start and stop" processing serves to increase the input/output time required to access data.* (See Application; p. 2, lines 18-29 (emphasis added)).

Thus, the present invention performs a "continuous" processing that compares a data key and a continuous stream of data continuously and without the interruptions that take place in Herman's "start and stop" or frame-by-frame processing.

The Office Action observed that MPEP § 2111 requires an Examiner to give “the broadest reasonable interpretation [of the claims] consistent with the specification.” While it is true that claims must be given their broadest reasonable interpretation, Applicant notes that this interpretation still must be consistent with the usage of terminology in the specification. The Office Action itself admits this much when it stated that the broadest reasonable interpretation given to the claims “*must be consistent with the specification.*” (See Office Action; page 10 (emphasis added)). As described above, the specification of the present application describes “continuous comparison” in a manner such that a person having ordinary skill in the art would find it *inconsistent* with the specification to interpret claims 9, 12, 18, 53, and 77 in a manner that encompasses Herman because, when the specification describes the “continuous” comparison between key and data that is recited by these claims, the specification expressly excludes the type of stop/start frame-by-frame comparison performed by Herman. A person of ordinary skill in the art would understand that the term “continuous” comparison as recited by the claims to require an uninterrupted processing between the key and data stream which is markedly different than Herman. Accordingly, Applicant respectfully submits that claims 9, 12, 18, 53, and 77, when given their broadest reasonable interpretation consistent with the specification, are patentable over Herman.

Because claims 9, 12, 18, 53, and 77 recite *continuously* comparing the key and a continuous stream of data, a limitation which is not described by Herman, Applicant respectfully requests that the rejection of these claims (and the claims dependent therefrom) be withdrawn.

### **III. Herman Fails to Disclose Frameless Comparisons; Instead Herman Requires the Exact Opposite - Framed Comparisons**

Claims 34, 59, 82-86, and 91 (and the claims dependent therefrom) recite limitations requiring a frameless comparison between a key with a data signal to find matches. The Office Action alleges without explanation that this feature is disclosed in Herman. However, as noted above in section II, Herman requires that a “*framer circuit*” 62 be used so that matching operations occur in accordance with the framed structure of the data records. (See Herman; Figures 2 and 3; col. 4, lines 20-21). As explained in Herman, each record is captured in a frame

that comprises data attributes and record status attributes. See Herman; col. 4, lines 60-65. Herman further discloses framer circuits that are configured to frame records transmitted on the database subchannels. See Herman; Figure 3; col. 5, lines 49-53; see also col. 9, lines 33-35. Applicant respectfully directs the Examiner's attention to page 9, lines 18-19, of the outstanding Office Action, wherein the Examiner acknowledges Herman's disclosure of framer circuits. *In direct contrast to Herman's requirement of framed comparisons, claims 34, 59, 82-86, and 91 require frameless comparisons.* As such, Applicant respectfully submits that claims 34, 59, 82-86, and 91, and the claims dependent therefrom, are not anticipated by Herman.

#### **IV. Herman Fails to Disclose Pattern Comparison Between a Continuous Data Stream and a Key**

Claims 12, 18, 58, 87, 91, and 112, and all claims dependent therefrom, recite a retrieval device that is configured to perform "pattern comparison" between the key and the data stream. The specification defines what is meant by the claimed phrase "pattern comparison":

A logical step 88 is suggested in FIG. 5 for returning to the continuous reading of data from the mass storage medium 26, indicating perhaps a "do" loop. However, it should be understood that this is a *continuous process* and that data is processed from the mass storage medium 26 *as a stream* and *not in individualized chunks, frames, bytes, or other predetermined portions of data*. While this is not precluded, the present invention preferably allows a key to be in essence "slid" over a continuously varying data read signal such that there is no hesitation in reading data from the mass storage medium 26. There is no requirement to *synchronize reading to the start or end of any multi-bit data structure*, or any other intermediate steps required to be performed as the data is compared continuously "on the fly" as it is read from the mass storage medium 26. *This type of comparison and correlation may be referred to as a pattern match or comparison.* (Application, p. 12, lines, line 14-34)(emphasis added).

Since "pattern comparison" has been explicitly defined in the specification, Applicant submits this definition will control how the claim must be examined. See MPEP § 2001.01, III ("Where an explicit definition is provided by the applicant for a term, that definition will control interpretation of the term as it is used in the claim").

Performing a "pattern comparison" between a key and a data stream eliminates the requirement that the target data be processed according to the multi-bit data structure

in which the target data is stored. In contrast, as discussed in section II, Herman describes a comparison operation that processes data on a frame-by-frame basis. As such, Applicant respectfully submits that claims 12, 18, 58, 87, 91, and 112 (and all claims dependent therefrom) are patentable over Herman.

**V. Herman Fails to Disclose a Programmable Logic Device**

Claims 72, 73 and 81, 98, 105, and 110 recite the use of a programmable logic device to perform the comparison between the key and data. The Office Action rejected these claims as being anticipated by Herman but did not provide a ground supporting its rejections.

Herman does not disclose a programmable logic device but is instead directed to a VLSI filter (see the Abstract). A VLSI circuit fails to anticipate a programmable logic device. Accordingly, Applicant respectfully submits that claims 72, 73 and 81, 98, 105, and 110 are patentable over Herman.

**VI. Herman Fails to Disclose Matching Operations Performed in the Analog Domain**

Claims 106 and 115 (and the claims dependent therefrom) recite matching operations performed in the analog domain using *analog circuitry*. Herman fails to disclose matching operations that take place in the analog domain. Instead, the matching operation disclosed in Herman is based on instruction sets that are executed by operational codes in conjunction with an ALU. Thus, Herman's matching operation clearly takes place in the digital domain. As such, Applicant respectfully submits that claims 106 and 115, and the claims dependent therefrom, are allowable over Herman. Applicant also submits that claims 107 and 116 which recite the generation of an analog key from a digital key are allowable because Herman is silent with respect to these features.

**VII. Herman Fails to Disclose Performing an Analog Level Pattern Comparison in the Digital Domain**

Claims 95 and 117 (and all claims depending therefrom) relate to performing an analog level comparison between an analog data signal and an analog key in the digital domain. “[A]ll of the operations exemplified by the analog processing shown in Figures 6-10, have their equivalent counterparts in the digital domain. Thus, approximate matching and correlation types of processing can be done on the standard *digital representation of the analog bit patterns*.” (See Application; p. 14, lines 11-15 (emphasis added)). As shown in Figure 7 of the application, the analog read signal from the mass storage medium “does not provide an ideal square wave output”. (See Application; p. 13, lines 3-5). To perform an analog level comparison between the analog data signal and a key in the digital domain, the analog readback signal shown in Figure 7 can be sampled at a high rate to capture the analog waveform. After this high rate sampling, correlation between the digital representation of the analog data stream and the digital key can be performed to compute a correlation coefficient that is compared with a threshold to identify matches. (See Application; p. 13, lines 11-27).

Herman fails to disclose a matching operation that operates on a digital representation of an analog level signal, but instead describes conventional digital domain matching operations. Furthermore, with respect to claim 96, Herman fails to describe the generation of the digital key by sampling an analog key at a high rate. As such, Applicant submits that claims 95, 96, and 117 (and all claims depending therefrom) are patentable over Herman.

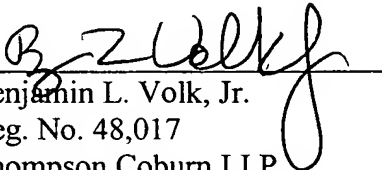


Application No. 10/722,691  
Attorney Docket No. 53047/44791

**Conclusion:**

For the foregoing reasons, Applicant respectfully submits that all pending claims are allowable. Favorable action is respectfully requested.

Respectfully submitted,

  
Benjamin L. Volk, Jr.  
Reg. No. 48,017  
Thompson Coburn LLP  
One US Bank Plaza  
St. Louis, Missouri 63101  
(314) 552-6000  
(314) 552-7000 (fax)